



U.S. Department of Energy
Office of Science

**Biological and Environmental Research
Advisory Committee Meeting**
Conference Call

*FY 2009 Budget Request
for the Office of Science and Perspectives*

Dr. Raymond L. Orbach
Under Secretary for Science
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www.science.doe.gov

U.S. Department of Energy



Office of Science



Setting the Nation's Priorities

"To build a future of energy security, we must trust in the creative genius of American researchers and entrepreneurs and empower them to pioneer a new generation of clean energy technology. . .

So I ask Congress to double Federal support for critical basic research in the physical sciences and ensure America remains the most dynamic nation on Earth."

**President George W. Bush
State of the Union Address
January 28, 2008**



The Office of Science

Office of Science FY 2009 Budget Request to Congress (dollars in thousands)

	FY 2007 Approp.	FY 2008 Request	FY 2008 Approp.	FY 2009 Request to Congress	FY 2009 Request to Congress vs. FY 2008 Approp.	
Basic Energy Sciences.....	1,221,380	1,498,497	1,269,902	1,568,160	+298,258	+23.5%
Advanced Scientific Computing Research.....	275,734	340,198	351,173	368,820	+17,647	+5.0%
Biological and Environmental Research.....	480,104	531,897	544,397	568,540	+24,143	+4.4%
High Energy Physics.....	732,434	782,238	689,331	804,960	+115,629	+16.8%
Nuclear Physics.....	412,330	471,319	432,726	510,080	+77,354	+17.9%
Fusion Energy Sciences.....	311,664	427,850	286,548	493,050	+206,502	+72.1%
Science Laboratories Infrastructure.....	41,986	78,956	66,861	110,260	+43,399	+64.9%
Science Program Direction.....	166,469	184,934	177,779	203,913	+26,134	+14.7%
Workforce Dev. for Teachers & Scientists.....	7,952	11,000	8,044	13,583	+5,539	+68.9%
Safeguards and Security (gross).....	75,830	76,592	75,946	80,603	+4,657	+6.1%
SBIR/STTR (SC funding).....	86,936	—	—	—	—	—
Subtotal, Office of Science.....	3,812,819	4,403,481	3,902,707	4,721,969	+819,262	+21.0%
Adjustments*.....	23,794	-5,605	70,435	—	-70,435	—
Total, Office of Science.....	3,836,613	4,397,876	3,973,142	4,721,969	+748,827	+18.8%

* Adjustments include SBIR/STTR funding transferred from other DOE offices (FY 2007 only), a charge to reimbursable customers for their share of safeguards and security costs (FY 2007 and FY 2008), Congressionally-directed projects and a rescission of a prior year Congressionally-directed project (FY 2008 only), and offsets for the use of prior year balances to fund current year activities (FY 2007 and FY 2008).



The Status of BER

- **BER is in a challenging and exciting period**
 - New Bioenergy Research Centers have been launched to lead transformational science for future biofuels.
 - Grand challenges for climate change research will address knowledge gaps in climate forcing, response, and change.
 - New directions in radiochemistry and instrumentation research will meet DOE missions while continuing to underpin needs of the nuclear medicine community.
 - Integrated Field Challenges will explore the mechanisms of contaminant mobility at DOE sites.
 - Planning begins for next generation of field studies on ecosystems impacts of climate change.
- **The FY 2008 Omnibus Bill was funded at the FY 2008 Request**
 - Additional funding was provided from Congress (\$17.5M) for nuclear medicine research
- **The FY 2008 Appropriation follows two years that brought:**
 - Significant increase for the Genomics: GTL Bioenergy Research Centers
 - Near level funding for climate change and medical applications research
 - Partial restoration of FY06 reduction for environmental remediation sciences research



The FY 2009 Budget Request: A New Era for Science

DOE Bioenergy Research Centers (\$75M)

Transformational scientific breakthroughs to meet future goals for biofuels

DOE BioEnergy Science Center – led by Oak Ridge National Laboratory, includes 9 other partnering institutions.

DOE Great Lakes Bioenergy Research Center – led by University of Wisconsin-Madison, in close partnership with Michigan State University, includes 6 other partnering institutions.

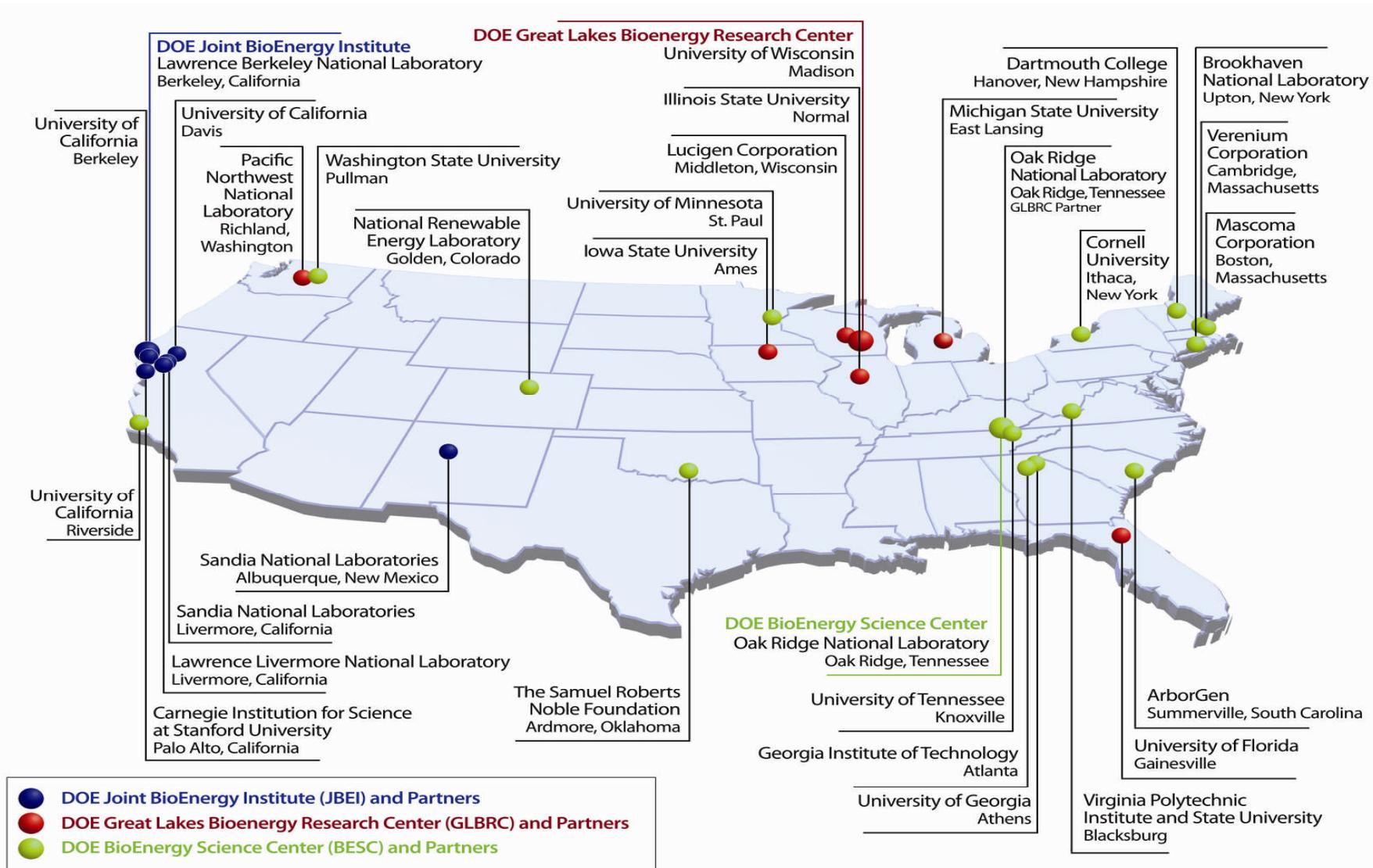
DOE Joint BioEnergy Institute – led by Lawrence Berkeley National Laboratory, includes 5 other partnering institutions.

- Centers are conducting basic research on microbes and plants to harness nature's own conversion methods and develop a new generation of optimized bioenergy crops to make production of cellulosic ethanol, sunlight-to-fuels, and other biofuels cost-effective.

The 36 billion gallons per year goal by 2022 cannot be reached with current technologies.



DOE Bioenergy Research Centers: Multi-Institution Partnerships





The FY 2009 Budget Request: A New Era for Science

Climate Change Modeling and Research (\$155M)

Providing policy makers with options for mitigating greenhouse gases and responding and adapting to climate change.

The FY 2009 budget ensures the U.S. is a leader in climate prediction tools and environmental observation and measurement

- Developing, testing, and applying fully coupled climate and Earth system models for projecting the response to natural and human-induced climate forcing at regional to global scales over decades to centuries.
- Climate modeling activities leverage the Office of Science's leadership class computing capabilities.
- Environmental measurements and field studies to understand the effects of climate change and inform and validate predictive models.
- Partnering with National Oceanic and Atmospheric Administration and the U.S. Climate Change Research Program.



Biological & Environmental Research (BER)

(FY 2009=\$568.5M)

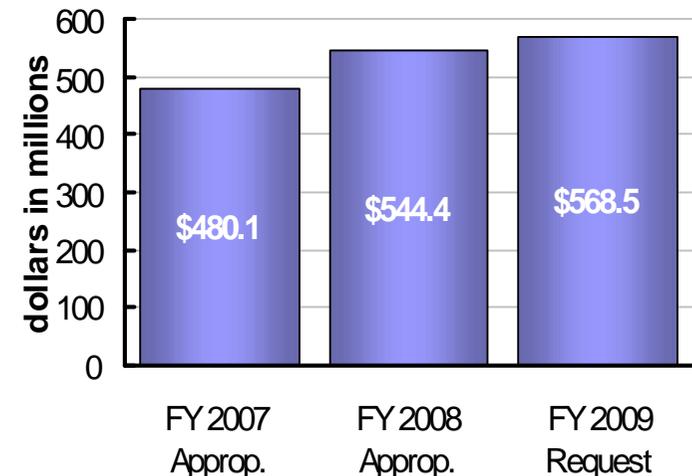
Biological Research:

- Life Sciences.** Three Bioenergy Research Centers continue to accelerate research in biofuels. Genomics: GTL research is enhanced, underpinning biotech solutions for DOE energy/environmental needs. Low dose radiation research activities are enhanced. Genome sequencing at the Joint Genome Institute continues to focus mission relevant needs for energy production, carbon sequestration, bioremediation, and low dose radiation research. Radiochemical and imaging research is enhanced to develop new imaging technologies and new applications for radiotracers in biology and the environment. (FY 2007=\$252.5M; FY 2008=\$294.7M; **FY 2009=\$296.2M**);
- Environmental Remediation Research.** Providing the scientific basis for understanding DOE's legacy environmental contamination issues; EMSL initiates multi-year program for acquisition of new/improved instrumentation (FY 2007=\$91.4M; FY 2008=\$93.8M; **FY 2009=\$98.4M**); and
- Medical Applications.** Supports fundamental research and instrument development in imaging for an artificial retina that allows patients to see large objects. (FY 2007=\$6.6M; FY 2008=\$8.2M; **FY 2009=\$8.2M**)

Climate Change Research:

- Supports the U.S. Climate Change Science Program to develop, test and improve climate models that simulate the responses of climate to increased atmospheric greenhouse gases and aerosols.
- Atmospheric Radiation Measurement Climate Research Facility adds a second mobile system to obtain observations of clouds and aerosols in poorly understood regions.
- Climate Modeling increases to exploit leadership class computing (FY 2007=\$129.6M; FY 2008=\$136.9M; **FY 2009=\$154.9M**)

Biological & Environmental Research





The Plan for BER

- **Our goal is a unique program of world-class, fundamental research and scientific user facilities that:**
 - underpin DOE’s energy, environment and basic research missions
 - provide novel insights into biological and environmental systems from the molecular to the ecosystem scale
- **A vision for BER’s future must include a scientifically compelling plan that:**
 - addresses grand challenges in biology and the environment
 - engages and is supported by the scientific community, the Administration, Congress, and the public
 - provides leadership and coordination with our interagency partners across all elements of the BER program
- **The scientific community is critically important:**
 - BER’s research portfolio has a broad constituency across many fields of science and is acknowledged to play a unique role in key mission-relevant areas.
 - The scientific community and BERAC need to develop strategies to better identify and communicate long-term BER basic research needs for tackling our Nation’s energy and environmental challenges.
 - The scientific community needs to make the case for the science, and its benefits to the Nation, to Congress, and to the public. Funding is not an entitlement.



Our Challenge

- The very large percentage increase between the essentially flat funding for the DOE Office of Science in FY2008 and the FY2009 President's Request will be an attractive target.
 - We could easily, again, become a “donor” program. This is true for all three American Competitiveness Initiative agencies.
- Compounding the danger is the widespread attitude that the proposed increases for the physical sciences under the ACI and America COMPETES act are “a done deal”.
- There is the possibility we may see a “three-peat” and a perpetuation of flat-to-declining budget trajectories.



The Office of Science Challenge

The Past and Present:

- The President's Request for SC for FY 2007 was \$4,102M.
The Appropriation for SC for FY 2007 was \$3,813M. $\Delta = - \$289\text{M}$.
- The President's Request for SC for FY 2008 was \$4,404M.
The Appropriation for SC for FY 2008 was \$3,903M. $\Delta = - \$501\text{M}$.
- The President's Request for SC for FY 2009 is \$4,722M.
The Appropriation for SC for FY 2009 in ?. $\Delta = \pm ?$ $\Sigma = - \$790\text{M} \pm ?$.

The Future?

- The President's Request for FY 2009 is \$819M more than the FY 2008 appropriation, a huge dollar increase. SC could easily, again, become a "donor" program. If we are to avoid this scenario we need to actively and publicly make the case for LONG-TERM basic research rather than demonstration projects using today's technology.

It is now up to us to make the case.



Looking Forward

The President's Budget Request for FY2009 remains a vote of confidence for the physical sciences, expressing unprecedented support:

“To keep America competitive into the future, we must trust in the skill of our scientists and engineers and empower them to pursue the breakthroughs of tomorrow . . . This funding is essential to keeping our scientific edge.”

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